CLAIMS

1. A method for reducing detrimental phenomena related to disturb voltages in a data storage apparatus employing passive matrix-addressing, particularly a memory device or a sensor device, wherein the data storage apparatus comprises a plurality of data storage cells for storing logical values as given by a specific charge value set in each cell, wherein each of the data storage cells comprises an electrically polarizable memory material exhibiting hysteresis, particularly a ferroelectric or electret material, wherein the cells are physically disposed in one or more matrices, wherein each of said matrices providing passive matrix addressability to the cells, wherein each of the matrices comprising a first and a second electrode set, wherein the electrodes of each set are provided in parallel, one set of electrodes forming word lines and the other set forming bit lines, wherein the word line electrodes and the bit line electrodes are provided crossing each other and in direct or indirect contact with the memory material, wherein the data storage cells of the apparatus are realized as capacitor-like elements defined in a volume of the memory material between or at the crossings of word lines and bit lines and can be set to either of at least two polarization states or switched therebetween by applying an active voltage pulse of a voltage V_S larger than the coercive voltage V_C corresponding to the coercive electric field of the memory material, between a word line and a bit line and over the data storage cell defined therebetween, wherein an application of electric potentials conforms to an addressing operation, and wherein the electric potentials applied to all word and bit lines in the addressing operation are controlled in a time-coordinated manner according to a predetermined voltage pulse protocol,
characterized by setting an addressed data storage cell to a first polarization state by means of a first active voltage pulse in the addressing operation, during which each bit line dependent on the voltage pulse protocol can be connected with a sensing means for detecting the polarization state of the data storage cell at least under a part of the duration of the first active voltage pulse; applying dependent on the voltage pulse protocol a second voltage pulse which can be a second active voltage pulse of opposite polarity to that of the first active voltage pulse and switching the addressed data storage cell from the first polarization state to a second polarization state, such that the cell being addressed is set to a predetermined polarization state as specified by the addressing operation, providing the data storage cells of

the data storage apparatus employing passive matrix-addressing in two or more electrically separated segments, each segment comprising a separate physical address space of the data storage apparatus; and directing data in the addressing operation to a segment that is selected based on information on prior and/or scheduled applications of active voltage pulses in the segments.

2. A method according to claim 1, characterized by applying the second voltage pulse to another cell than that subjected to the first active pulse, whereby all cells at the physical address of the other cell are pre-set to either the first polarization state or to the second polarization state and are located in a segment different than that subjected to the first active voltage pulse.

3. A method according to claim 1, characterized by explicitly storing information on cells at a certain address and which are pre-set to a polarization state after an active voltage pulse of same polarity has been applied to each cell at the address.

4. A method according to claim 3, characterized by storing information on the pre-set polarization state with reference to the physical address of the cell.

5. A method according to claim 3, characterized by retrieving the stored information on the polarization state prior to subjecting a cell to the second voltage pulse.

6. A method according to claim 5, characterized by applying the optional second active voltage pulse with opposite polarity to the first active voltage pulse if the pre-set polarization corresponds to the first polarization state, and applying the optional second active voltage pulse with same polarity as the first active voltage pulse if the pre-set polarization corresponds to the second polarization state.

7. A method according to claim 3, characterized by removing the stored information on the cell being pre-set to a polarization state after subjecting each of the pre-set cells at the address to the second voltage pulse.

8. A method according to claim 3,
characterized by storing information on the total number of pre-set cells.

9. A method according to claim 1,
characterized by directing data in an addressing operation to the segment with the longest time since last being subjected to an active voltage pulse.

10. A method according to claim 9,
characterized by using a queue; putting a reference to the segment most recently subjected to an active voltage pulse last in the queue and retrieving a reference to the segment with the longest time since being subjected to an active pulse from first position in the queue.

11. A method according to claim 9,
characterized by storing references to each of the segments in a "segment table" with additional information connected to each of the references.

12. A method according to claim 11,
characterized by the additional information being number of addresses with pre-set cells in the referenced segment and/or timestamp of last segment access and/or lock state mark and/or physical addresses to pre-set cells in the referenced segment and/or a pre-set polarization state mark connected to each of the physical addresses to pre-set cells.

13. A method according to claim 12,
characterized by removing the physical address of the cell subjected to the second voltage pulse from the segment table.

14. A method according to claim 12,
characterized by adding the physical address of the cell subjected to the first active voltage pulse to the segment table.

15. A method according to claim 12,
characterized by setting the lock state mark of a segment reference in the segment table when the first active voltage pulse or the second voltage is applied to a cell in the segment corresponding to the segment reference.

16. A method according to claim 12,
characterized by updating the timestamp of last segment access of a segment reference in the segment table when the first active voltage pulse or the

second voltage pulse is applied to a cell in the segment corresponding to the segment reference.

17. A method according to claim 12,
characterized by unsetting the lock state mark of a segment reference in the segment table when the difference between current time and the timestamp of last segment access for the segment reference exceeds a predetermined value.

18. A method according to claim 1,
characterized by storing the physical address of the cell subjected to the second voltage pulse with reference to the logical address of the addressing operation.

19. A method according to claim 18,
characterized by storing the physical address with reference to the logical address in an "address mapping table" with optional address level information connected to each of the physical address entries in the address mapping table.

20. A method according to claim 19,
characterized by the address level information being a pre-set mark and/or a pre-set polarization state mark and/or a segment reference.

21. A method according to claim 19,
characterized by storing the address mapping table in a fast access memory other than the data storage apparatus employing passive matrix-addressing.

22. A method according to claim 19,
characterized by not listing a predetermined number of addresses to pre-set cells in the address mapping table.

23. A method according to claim 19,
characterized by retrieving the physical address with the address level information from the address mapping table before applying the first active voltage pulse and/or the second voltage pulse.

24. A method according to claim 23,
characterized by not applying the first active voltage pulse and bringing the second voltage pulse forward in time if finding a set pre-set mark.

25. A method according to claim 23,
characterized by not applying the first active voltage pulse and bringing the second voltage pulse forward in time if the addressing operation is write and if the address of the pre-set cells is listed in the address mapping table.

26. A method according to claim 23,
characterized by not applying the first active voltage pulse and bringing the second voltage pulse forward in time if the addressing operation is write and if the total number of pre-set cell addresses are exceeding a predetermined value.

27. A method according to claim 18,
characterized by storing the logical address in part of the data storage cells at the physical address corresponding to the logical address.

28. A method according to claim 1,
characterized by distributing addresses whereat each cell are pre-set to the same polarization state among the segments during idle time when no other higher-priority operations are ongoing or imminent in the segments.

29. A method according to claim 28,
characterized by executing a read with write-back operation in the segment with the least number of pre-set cells.

30. A method according to claim 1,
characterized by creating cells that are pre-set to the same polarization state at a free address during idle time when no other higher-priority operations are ongoing or imminent in the segments.

31. A method according to claim 30,
characterized by applying a single polarity active voltage pulse to each cell at the address.

32. A method according to claim 30,
characterized by selecting the address in the segment with the least number of pre-set cells

33. A method according to claim 1,
characterized by imposing a delay before applying the first active voltage pulse if the second voltage pulse of the preceding operation, or any of a

predetermined number of preceding operations, was applied to the same segment as the current addressing operation.

34. A method according to claim 1,
characterized by imposing a delay before applying the first active voltage pulse if the difference between current time and the last time the segment was subjected to a first active voltage pulse or a second voltage pulse does not exceed a predetermined value.

35. A method according to claim 1,
characterized by imposing a delay before applying the second active voltage pulse if the difference between current time and the last time the segment was subjected to a first active voltage pulse or a second voltage pulse, does not exceed a predetermined value.

36. A method according to claim 12,
characterized by waiting to apply the first active voltage pulse until the lock state mark of the segment to be subjected to the first active voltage pulse has been unset, and/or waiting to apply the second voltage pulse until the lock state mark of the segment to be subjected to the second voltage pulse has been unset.

37. A method according to claim 1,
characterized by analyzing the consecutive operation or a predetermined number of consecutive operations before executing the current addressing operation.

38. A method according to claim 37,
characterized by selecting another segment than addressed by the consecutive operation or by a predetermined amount consecutive operations for application of the second ~~voltage pulse~~ of the current addressing operation.